Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D.C. 20554

In the Matter of	)	
	)	
IP-Enabled Services	)	W.C. Docket No. 04-36

COMMENTS OF NORTEL NETWORKS

Introduction

Nortel Networks is pleased to have the opportunity to comment in this important proceeding. We commend the Commission for initiating this Notice of Proposed Rulemaking (Notice) examining issues relating to services and applications making use of Internet Protocol (IP), including but not limited to voice over IP (VoIP) services (collectively, "IP-enabled services"). We encourage the Commission to move this proceeding forward in an expeditious manner to remove regulatory uncertainty thereby helping ensure that the U.S. remains at the forefront of technology innovation and the deployment of advanced communications capabilities.

Nortel Networks is delivering networking and communication services and infrastructure to service providers and enterprises in more than 150 countries. Customers in the United States, Europe, Asia-Pacific, the Caribbean and Latin America, the Middle East, Africa, and Canada benefit from Nortel Networks commitment to technology leadership and culture of innovation.

Nortel Networks is not itself a provider of IP-enabled services. However, we believe that we can assist the Commission by leveraging our vast technology expertise – and experienced leadership in both PSTN and IP technologies - to act as a resource to the Commission. In these comments, we propose solutions to complex technology issues associated with the deployment of IP-enabled services and provide additional technological depth on issues that may affect regulatory policy.

Executive Summary

The fundamental value of IP is the ability to deliver voice, data, video, and real-time communication services over a very cost-effective converged packet network. Nortel Networks agrees with the Commission's statement that "the Internet has transcended jurisdictional boundaries to become one of the greatest drivers of consumer choice and benefit, technical innovation, and economic development in the United States . . ."[1] We share this view with our vision of "business without boundaries," and the belief that as boundaries are eliminated – in terms of geography, technology platforms, access devices, and classifications of service provider - all Americans will benefit.

For business, this means eliminating the boundaries between the office and the rest of the world with next-generation technologies that provide competitive advantage to virtually all businesses and, by extension, to the national economy. True mobility and access to applications regardless of the location or device will greatly enhance business and individual productivity, making work an activity rather than a location.

[1] Notice, p. 2.

For businesses and consumers, this means a range of IP-enabled services and capabilities that are focused on what people value: Mobility, Multimedia, and Personalization. IP and Web services are virtualizing connectivity and bandwidth and transforming control to the consumer from the service provider. Consumers are empowered with choices of services, access platforms and devices, locations, and service providers. But the communications networks required to deliver these capabilities must connect users with intelligence, robustness, and security.

In these comments Nortel Networks will:

1. Provide an overview of communications in the early 21^{st} century;
2. Describe the network transformation that is critical to delivering IP-enabled services;
3. Address specific social policy concerns associated with the deployment of IP-enabled services;
4. Discuss the "Geography of VoIP;"
5. Provide an example of business case analysis that demonstrates the potential cost savings realized by IP networks; and
6. Describe the paradigm shift with network and service independence.

Together, these demonstrations will establish the inevitability of network migration to IP-based communications and the role that "light-handed" regulation can play to ensure that this evolution is not slowed.

1. Communications in the 21st Century

Beyond Voice . . . the move to Multimedia Communications

The integration of communications

In the latter part of the 20th century, communication was dominated by a single medium - primarily voice. Important communication exchanges were conducted face-to-face so that participants could utilize a variety of media (voice, video/vision, text, etc.) to ensure clear communication of thoughts, ideas, emotions, etc. And this was relatively simple because the participants were either in the same location or could easily travel to meet in a common location.

At the start of the 21st century, we are witnessing a dramatic evolution in individual communications – both personal and business related. With the increased geographic dispersion of families, friends, and employees -- and an increasing reluctance/inability to travel -- face-to-face meetings for important communications are frequently no longer an option. Combined with the immediacy of certain communication exchanges, a communications gap has resulted.

Fortunately from the end user's perspective, technology is addressing that gap insofar as today's communications environment is characterized by numerous communications devices, such as home and business phones, pagers, cell phones, wireless PDAs, and PCs; a multitude of networks, including voice, data, and wireless; and a wide variety of applications, including voice, email, instant messaging, presence, file sharing, and video streaming.

Unfortunately, both consumer and business end users are also feeling a little "walled in" by their communications solutions. Both groups have experienced significant frustration with their inability to get different devices, applications, and even networks to work together.

We are now poised at the beginning of a new era of communication – one which is marked by the *integration* of communications. And it is this *integration* of communication through IP-enabled technologies, networks, devices and services that is really key. The last 20 years have been marked by the emergence of many discrete communications – like the PC, the PDA, the cell phone, the instant message. Some have had a tremendous impact on our lives. But going forward, it will be the *integration* of these multiples devices and media into one communication session that will revolutionize the way we interact.

This integration will enable us to be reached anywhere we want, anyway we want, and anytime we want – all with one address. Today, most people have between three and seven personal addresses: home phone number, work phone number, cell phone number, IM address, work email address, personal e-mail address, etc. With the emergence of IP-enabled services, we'll be able to really simplify the way we communicate. We're in for a dramatic change in how we communicate—locally and globally.

As Chris Hartman pointed out in her report, *IP Changes Everything – VoIP vs. Circuit Switched*, "But these largely voice-oriented offerings only provide a starting point.

Carriers will need to go beyond traditional voice services and begin to tap the real power of convergence by facilitating multimedia interactions." [2]

In support of this hypothesis, Nortel Networks worked with Pollara, Inc., a leading market research firm, to research the value of next-generation IP-enabled services to consumers, both residential and home-office. The research had two goals – to determine today's consumer communications needs and to put a set of IP-enabled services in front of consumers to determine the value of such services.

One of the most interesting findings of this study is that a broadband phone service, without any added next-generation services has little value to broadband consumers. Less than five percent of consumers say they would pay for a broadband phone service that does not include any additional next-generation services.[3]

The changing paradigm of personal communications in the 21st century will be enabled by innovative new technologies that will rapidly close the multimedia communications gap.

IP-based communication, no matter whether the platform is wireless or wireline, is unique in its ability to enable the delivery of these "next-generation services" because it provides the common infrastructure necessary for the integration of communications by providing:

- ubiquity (eliminating boundaries and enabling the delivery of a common set of services across multiple types of networks)

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[2] *IP Changes Everything – VoIP vs. Circuit Switched* (Probe Financial Associates, July 9, 2003).
[3] For a more detailed understanding of the market research report – including a description of what consumers want and are willing to pay for – please see Appendix 1.

- packetization (providing a common infrastructure for the integration of multiple media – voice, text, video), and
- personalization (using the Web paradigm to customize an end user's communications to fit their specific needs, devices, and locations).

Where are we today in terms of IP-enabled services? Broadband industry players have identified the voice, video (television) and data service bundle as the "triple play." With wireless added, we have the "quadruple play." But we will quickly move beyond even the quadruple play as service providers add new integrated multimedia services and applications. While Nortel Networks believes this technological evolution is inevitable, regulation (or limitations thereon) can affect the pace at which these improvements are deployed.

In order to establish a regulatory framework for VoIP and other IP-enabled services, it is useful to consider the historic role of voice services; how that role is evolving over time; and how consumers will want to use these services in going forward.

2. The Network Transformation

In the previous section we established that the nature of communication is changing. In order to deliver these new types of services, there is a fundamental change to the way networks are being built. Service providers are now in the midst of this network transformation.

In order to build an effective regulatory framework for IP-enabled services, it is useful to understand the nature of the network transformation.

For many years, service providers have enjoyed solid revenue streams from their voice, private line and switched data businesses while supporting the less profitable, but emerging IP data transport business. Meanwhile, IP traffic volumes increased at exponential rates. In 2002, IP revenue-bearing traffic displaced voice traffic as the largest volume component of carrier networks,[4] yet it continues to generate less than ten percent of all service provider revenue. The implications of this shift cannot be overstated, and service providers consequently have been faced with the re-evaluation of their entire business model.

Other changes have gone hand in hand with the dominance of IP. The strong business case for migrating voice to a packet-based network has led to a convergence of voice and data networks on a single packet infrastructure. The trend to carry even more essential services over packet networks has generated a need for an IP network that is more robust, secure, and scalable than conventional router technology can deliver. In addition, a growing mix of hosted and managed services over a single network has generated requirements for service differentiation that are best addressed by adding intelligence to the network.

The changes that are reverberating through the industry are too profound and far-reaching to be solved by patchwork solutions. They require nothing less than a complete transformation of the service provider business model, and a corresponding transformation of the underlying networks. This network transformation will encompass three key requirements: network convergence, carrier grade performance, and service intelligence. The result will be a packet network that is far more intelligent, reliable, secure, scalable, manageable, and efficient than today's router-based IP networks.[5]

[4] Ryan Hankin Kent, Telecom Economics Market Update, August 2003.
[5] For a detailed description of the network transformation, please see Appendix 2

3. Social Policy Concerns

Nortel Networks believes that the application of traditional voice regulations to VoIP – and IP-enabled services – would stifle innovation and restrict economic growth. We advocate a "minimalist" approach to IP-enabled services regulation; however, we also recognize the importance of ensuring that key social policy objectives are met as the industry moves from circuit-switched voice to IP. Three areas of critical importance include law enforcement access to IP-enabled services, disability access, and emergency 911 services.

Law Enforcement Access

Chairman Powell points out that "law enforcement access to IP-enabled communications is essential."[6] Nortel Networks has been working with the FCC, law enforcement agencies and our carrier customers since the inception of the Communications Assistance for Law Enforcement Act (CALEA) as it applied to circuit-switched architectures. We will continue to assist in the transition to packet-based networks and VoIP.[7]

Disability Access

With respect to disability access, Nortel Networks and indeed all equipment suppliers and service providers must consider the requirements set forth in sections 255 and 251 (a)(2) of the Telecommunications Act of 1996 in the context of IP-enabled

[6] Statement of Chairman Michael K. Powell – Re: IP-enabled services, WC Docket No. 04-36.

[7] The Commission is also considering this issue in the context of a Petition for Rulemaking by the Department of Justice/FBI.

services and VoIP. Communications technologies should expand the accessibility and usability of communications networks by persons with disabilities. This means, to the extent technically and operationally feasible, designing accessibility into communications technologies and applications. Indeed, IP-enabled services and VoIP may eventually provide new solutions to old accessibility issues.

Emergency 911 Service

Nortel Networks applauds the Commission for seeking comments on the "effectiveness of alternatives to direct regulation to achieve our public policy goals," and in citing work by the National Emergency Number Association (NENA) and the Voice on the NET (VON) coalition in seeking voluntary agreement on "approaches to provide VoIP subscribers with basic 911 service, and to work together to develop solutions that may lead to VoIP subscribers receiving enhanced 911 functionality." [8] The following information is a summary of an initial proposal by Nortel Networks to achieve this goal.

On March 16, 2004, Nortel Networks presented at the National Emergency Association's Technical Development Conference in Orlando, Florida. The focus of the presentation was an architecture for the routing, delivery and location identification of a 9-1-1 call from a potentially nomadic or mobile VoIP device. The presentation, accompanied by a detailed white paper (attached hereto as Appendix 3) addresses several key issues with respect to VoIP and E9-1-1:

- A VoIP device can and will exhibit nomadic (or mobile) behavior.
- If a VoIP device is nomadic, its location must be determined in order to route the 9-1-1 call to the correct Public Safety Answering Point (PSAP).

[8] Notice, p.38.

- Unlike traditional wireline service, the phone number associated with the VoIP device may not be relevant to the area in which the device is located (*e.g.* a Chicago phone number and the device is located in New York) and therefore, cannot be used for routing of a 9-1-1 call.
- Once the location and routing of a 9-1-1 call for a VoIP device is determined, and the correct PSAP identified, the PSAP operator should also receive the location of the VoIP caller.

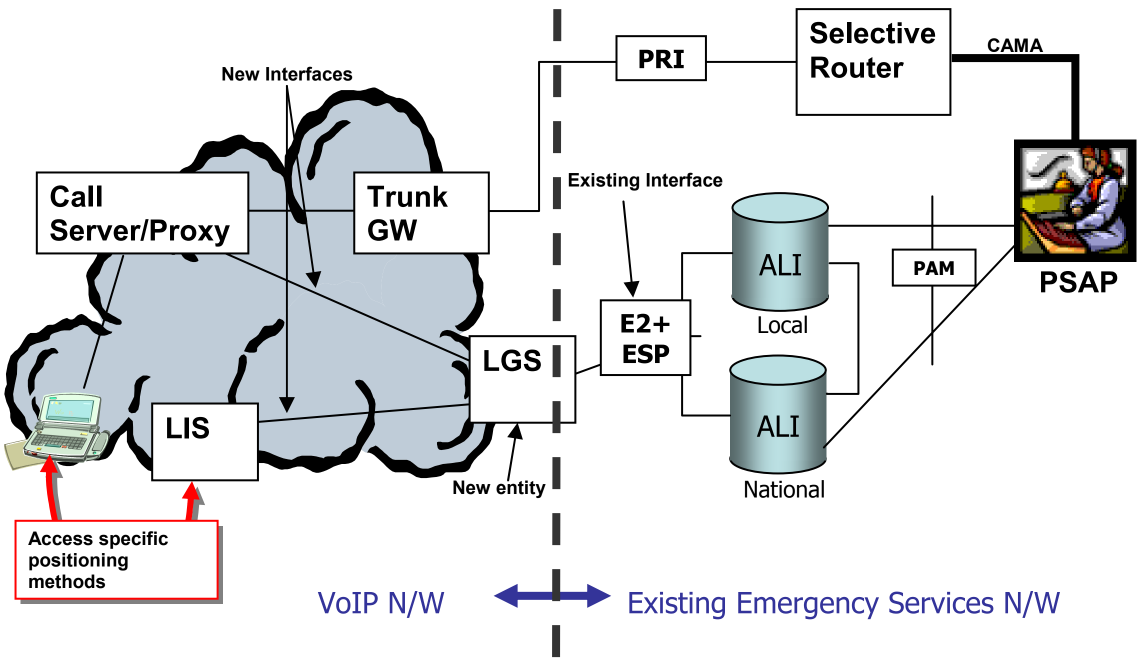
The proposal identifies a mechanism by which the existing emergency network interfaces can be used unchanged and defines the signaling mechanisms which allow the routing of emergency calls to be performed together with the delivery of caller location information without the need for static information to be provisioned or retained in the emergency network. Borrowing from the principles adopted to deploy cellular E9-1-1 Phase 2 functionality, this architecture similarly allows the necessary information to be extracted from the network and delivered dynamically for the duration of an emergency call.

The federal government's General Accounting Office estimates that the wireless industry will need to spend 8 billion dollars over the next five years to deploy E9-1-1 infrastructure.[9] Nortel Networks' proposal leverages this investment in wireless to resolve the VoIP E9-1-1 challenge. By using already-proven technology, the VoIP E9-1-1 solution may be implemented more seamlessly and cost-effectively.

9 GAO Report to the Chairman, Subcommittee on Communications, Committee on Commerce, Science, and Transportation, U.S. Senate – Telecommunications: Uneven Implementation of Wireless Enhanced 911 Raises Prospect of Piecemeal Availability for Years to Come, November 2003, p.1.

At the heart of Nortel Networks proposal is the coupling of innovative new VoIP interfaces with the field proven E9-1-1 technology deployed in today's wireless networks.

Nortel Networks Framework Architecture for VoIP/E9-1-1



Nortel Networks proposes the re-use of the existing wireless 9-1-1 network infrastructure, specifically the re-use of the E2 interface, which would couple the VoIP network to the wireless 9-1-1 network using the entity referred to as the Location Gateway Server (LGS). The LGS uses the existing E2 interface to the PSAP, so from this standpoint only minimal upgrades would be required to the PSAP.

The new interfaces would tie the LGS into the VoIP network from two points, the Location Information Server (LIS) which determines the presence of a device on the network and the Call Server (or Proxy) that "registers" a VoIP device with the network. The LIS to LGS interface provides location updates to the LGS when a device moves or goes online. The Call Server to LGS interface facilitates the transfer of information to allow routing of a 9-1-1 call to the correct PSAP. It is important to note that these new interfaces are within the VoIP network and, therefore, do not affect the PSAP infrastructure.

In summary, the innovation is the combination of re-use of an already proven technology (the wireless 9-1-1 infrastructure) coupled with the interfaces and new functionality (the LIS) required on the VoIP network to provide proper routing of a 9-1-1 call and the ability of the PSAP to retrieve near real-time location updates. This allows full E9-1-1 functionality to be quickly introduced for VoIP while minimizing the capital outlay required by the PSAP.

4. Geography of VoIP

VoIP will present some unique regulatory challenges for the FCC because of its inherently non-location specific nature that makes it impossible to distinguish between local, long distance and international services. This "Geography of VoIP," as we call it, is very different from today's voice networks.

There are two "Geography of VoIP" issues that should be considered from a regulatory perspective: national vs. international and interstate vs. intrastate.

Because VoIP has no geographic boundaries, the current interstate vs. intrastate structure does not work with VoIP. The current structure is creating jurisdictional conflicts that are slowing down the delivery of rich, new services that consumers will value and that will further reinvigorate the telecom sector.[10]

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[10] As discussed in the previous section, it is possible to track the location of nomadic VoIP devices in order to permit routing of E-911 calls to the proper PSAP and provide it with the location of the caller. However, it is not currently possible (or feasible) for the network to also track the location of a called party so as to determine where a VoIP call originates and terminates for jurisdictional purposes. Moreover, the

The greatest regulatory certainty is provided when clear, well-written laws are passed, and regulations adopted. As such, it is not sufficient to merely review the regulation of VoIP, but rather the broader regulatory and legislative issues that are impeding the wide-scale deployment of VoIP.

Nortel Networks believes that the U.S. needs to adopt a single federal regulatory framework for VoIP. The tremendous growth of the mobile services sector was facilitated by an analogous determination that there should not be potentially inconsistent state regulations governing these services.

The national vs. international debate takes a different form. In the current regulatory environment, it can be cheaper and easier for a VoIP reseller outside the U.S. to offer services to US citizens than it may be for domestic providers to offer the same services. The experience with the on-line gaming industry is instructive for VoIP: many on-line gambling companies moved off-shore to avoid regulation and taxes. In considering an appropriate regulatory framework for VoIP, regulators must ensure that onerous regulations don't cause the same result with VoIP providers with U.S. jobs unnecessarily being forced overseas. The FCC should adopt a policy that ensures regulatory treatment for domestic VoIP providers that encourages the delivery of VoIP from the U.S. rather than from foreign countries with potentially more favorable regulatory climates. Most importantly, regulators must ensure that VoIP providers that rely on the PSTN pay their fair share to support it – regardless of where they are located. The PSTN is a critical infrastructure that must be maintained.

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same "connection" may be utilized to call multiple parties/locations simultaneously or sequentially. Thus, it is not possible to categorize VoIP calls as "interstate" or "intrastate."

5. IP Networks and Cost Savings

Chairman Powell accurately points out that "IP networks cost much less to build and operate."[11] It is true that Carrier VoIP technology is far simpler and efficient to own and operate that traditional circuit-switched technology. Generally, VoIP technology reduces a service provider's operational and capital costs. While the specific deployment configuration determines the actual savings, analysis and real-world deployments and actual service provider traffic indicate that, on average, service providers can save up to 50% on capital costs and up to 30% on operational savings.[12] Capital cost savings typically accrue from eliminating inter-machine trunks and cross connects, "delayering" the network, collapsing up to 90% of end offices, and eliminating the circuit-switched core network. Operational cost savings typically accrue from the reduction of tasks associated with engineering and maintenance.

Nortel Networks has conducted a number of studies on carrier networks and quantified the following business value through potential capital and operational savings:[13]

Customer	Application	Savings	Justification
Carrier 1	Tandem Trunking	28% Tandem Cash Flow Improvement	- 34% OPEX Savings - 12% Port Reduction
Carrier 2	Universal Access	29% OPEX Savings 60% CAPEX Savings on New Growth	- 70% Node Reduction - Integrated DSL - Integrated Private Lines
Carrier 3	Integrated Access	75% OPEX Savings	- Leverage Data Network

[11] Ibid, p.2.
[12] Please refer to Nortel Networks Disclosure statement contained in Appendix 4.
[13] Ibid, please see Disclosure Statement.

		over TDM Networks	- Eliminate Loop Wiring
Carrier 4	Packet Trunking	40% OPEX Savings in Transit Network	- 40% Trunk Reduction - Node Reduction - Integrated Data Network
Carrier 5	Packet Trunking	30% OPEX Savings in Transit Network	- 80% Savings in Leased Line Costs -38% Node Reduction

One of the major cost savings in deploying a packet network is in the trunking. In a TDM environment, many phone calls are routed between End Offices, Tandem Offices and IXC Offices. The facility that connects these offices in the network is a DS-1, or T1, and in most cases there are many T1s that are provisioned between offices or nodes. The number of T1s provisioned will depend on the amount of call traffic between end points. Each T1 facility consists of 24 channels or trunks, and when many trunks are needed between nodes, the trunks are logically grouped into trunk groups. Trunk groups define to which end office the trunks in the trunk group are destined (i.e. SS7 Destination Point Code) and what information is sent to – and received from – the far end. In some of the larger nodes in a network, there can be over 100,000 trunks and hundreds of trunk groups of various sizes on a single node. The number of trunks in tandem and IXC offices will be significantly more than end offices because these offices normally do not provide access, but serve as connection points between nodes for local and toll calls.

A key benefit of converting from TDM to packet is the dynamic channel use in a packet network versus the dedicated channel use of a TDM network (Figure 1). Channels in a TDM network are "nailed up" from one node to another, and these channels can only be used for traffic between the two nodes. Even more constraining in the TDM environment, is the assignment of trunk groups. Trunk group definitions always map one-for-one to the number of physical trunks between two nodes. Different traffic types between two nodes necessitate the use of different trunk groups, but in a TDM environment once the channels assigned to the trunk group are used, new calls must find an alternate route, even though there may be available channels in the other trunk groups that connect the same two nodes.

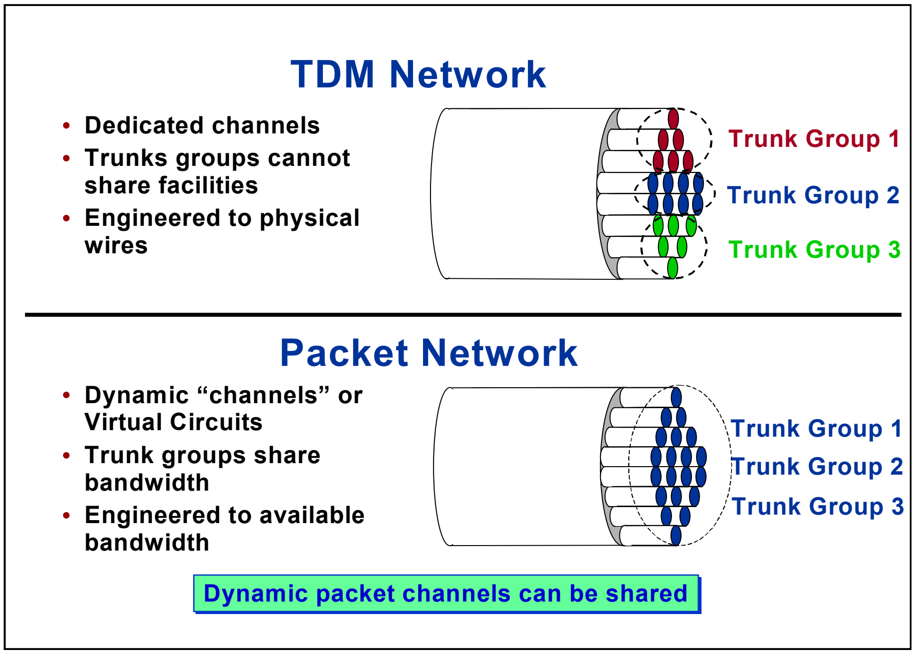

Figure 1 Packet Trunking versus TDM trunking

In a packet network, channels are actually dynamic virtual circuits which are not dedicated between two nodes. All the virtual circuits can be used to route to any other node in the network. In a packet environment, there is still a need for trunk groups, but the trunk group becomes a logical definition versus a mapping to the exact physical trunks leaving the office. Every defined trunk group could use any of the virtual circuits that are routed to the packet network and use of alternate routing should be a rarity. The packet network allows the sharing of bandwidth which cannot be done with TDM.

The new packet trunk group definitions have been named Dynamic Packet Trunks (DPT). Each trunk group can be assigned to all the bandwidth out of the office which improves utilization. Also, the definition is simplified because there are no longer individual trunk definitions. The individual trunk definitions are replaced by SS7 virtual Circuit Identification Codes (CICs) between nodes defined in the trunk group. A carrier can assign a series of up to 128,000 CICs which serve as virtual DS-0s in a DPT trunk group.

By taking the DPT concept one step further, we can show the number of trunks that can be saved by using packet instead of TDM (Figure 2). This is a simplified example of the potential trunk savings that can be saved at one node (highlighted in yellow in Figure 2) by using packet trunking. In actual practice, there are probably hundreds of trunk groups defined between nodes in the network, but this method for assessing the trunk requirements for TDM versus packet can be extrapolated over hundreds of trunk groups as well.

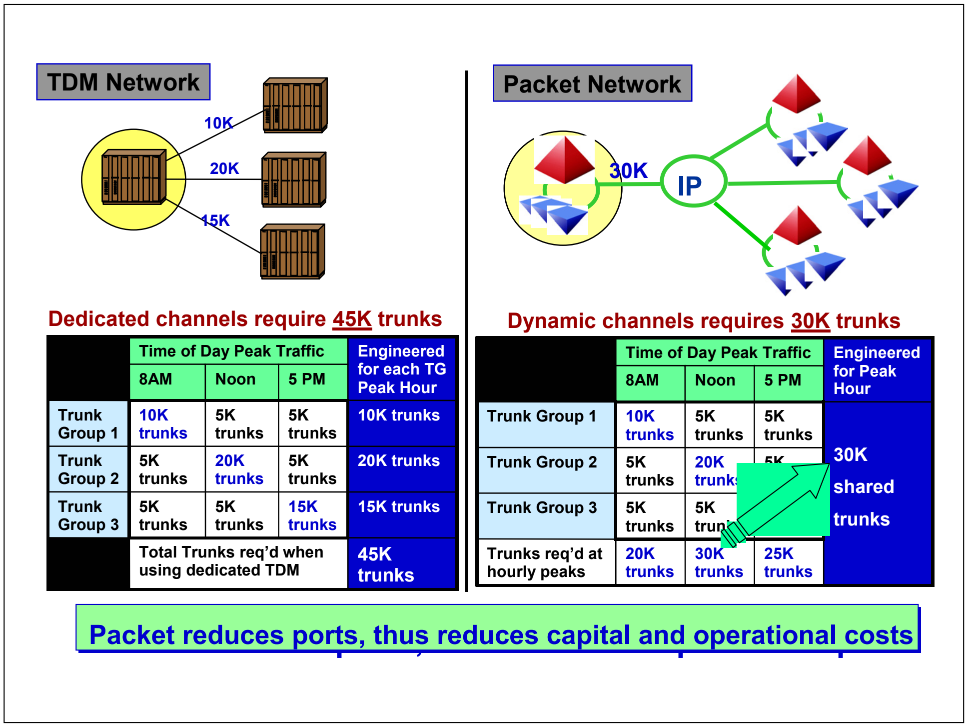

Figure 2 Packet Trunking versus TDM trunking

As shown on the left in this example, each TDM trunk group must be engineered to cover the peak traffic for the time of day. Trunk Group 1's peak is 8 a.m. with 10,000 trunks, Trunk Group 2's peak is noon with 20,000 trunks, and Trunk Group 3's peak is 5 p.m. with 15,000 trunks. Thus 45,000 trunks must be engineered. We use a single day for this example, but each carrier would need to determine High Day Busy Hour for each of their respective Trunk Groups to estimate trunk savings.

We can apply the same traffic model to a packet network except in a packet network the trunks can all be shared so the number of trunks provisioned should match the traffic for the peak hour. In the example, the peak hour of Noon requires 30,000 physical trunks which is one third less than what is required in the TDM environment. Not all networks will provide 33% improvements, but most networks may realize a 10-15% reduction in trunk facilities required. The difference is that packet can share virtual circuits and there only needs to be enough bandwidth to handle the high hour usage. In a TDM environment, trunk groups must be engineered for the high hour of each trunk group which can result in idle bandwidth, which cannot be used, when traffic patterns change.

From an operational perspective, we have now reduced the number of trunks that need to be maintained and simplified the administration of the trunking. This helps reduce the carriers overall operational (and capital) cost.

6. Paradigm shift: Network and service independence

Telecommunication networks are the critical infrastructure by which people communicate, businesses transact, governments operate, and national defense is conducted.

As we move the critical PSTN networks towards IP, it is imperative that we ensure the economic viability of the network. Although IP networks offer tremendous opportunity for operational savings – as we discussed in the previous section – a new economic paradigm is emerging which may pose a challenge to the economic viability of the PSTN.

The PSTN is a capex and opex intensive infrastructure which, although serving all Americans, is paid for by the carriers. It can be costly to ensure that the network has the necessary levels of reliability and security to operate. It can be costly to ensure that E9-1-1, CALEA and other regulated functionality is enabled.

An interesting discontinuity is emerging as VoIP gains prominence. In the circuit-switched era, services were linked to the lines/facilities and were embedded in specific network nodes. With VoIP, services can be decoupled from the network and delivered from anywhere. They are created in software – not hardware -- and can be offered via a server located anywhere in the world. A VoIP service provider need not locate any equipment in a country in which they are providing services. And they need not own or operate any access or network infrastructure in the country in which they are providing services.

This means that most of building and maintaining the network infrastructure will remain with the carriers (LECs and IXCs), while today's voice profits could be reaped by the non-facilities based, VoIP service provider. Essentially, these VoIP service providers have an opportunity to enjoy the benefits from the carriers' networks, without contributing to their upkeep. America's carriers (IXCs and LECs) should be equitably compensated for access to their networks.

This discontinuity becomes most pronounced as additional regulations or requirements are imposed – such as E9-1-1 and CALEA. For these capabilities to be provided, additional costs and on-going administration will be required by the network providers – not the VoIP service providers.

It is, therefore, imperative that any regulatory framework for VoIP and other IP-enabled services be created with reference to the regulatory framework for network access. Specifically, we must also consider IP-enabled services in the context of the following: the Cable Modem Notice; the Incumbent LEC Broadband Telecommunications Service Notice; the Triennial Review Notice; and the Wireline Broadband Internet Access Services Notice; and, the implications of the *Computer Inquiries* rules. Anything less would be short-sited because the economic paradigms of the two are intrinsically linked.

Conclusion

Nortel Networks appreciates the opportunity to comment in this important proceeding, and we are committed to assisting the Commission reach an expeditious conclusion.

The fundamental value of IP is the ability to deliver voice, data, video, and,real-time communication services over a very cost-effective, converged packet network. But more important, America's consumers will benefit from IP-enabled services with applications involving teleworking, telemedicine, E-learning and distance education, as well as entertainment. The social and economic benefits to the nation are clear. The challenge will be to eliminate any boundaries that impede the deployment of IP-enabled services and the benefits and choices such services provide to the American consumer.

Respectfully submitted,

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